

BEFORE THE  
POSTAL REGULATORY COMMISSION  
WASHINGTON, D.C. 20268-0001

PERIODIC REPORTING  
(PROPOSAL FOUR)

Docket No. RM2016-12

**RESPONSES OF THE UNITED STATES POSTAL SERVICE  
TO QUESTIONS 1-9 OF CHAIRMAN'S INFORMATION REQUEST NO. 1**  
(September 13, 2016)

The United States Postal Service hereby provides its responses to Questions 1-9 of Chairman's Information Request No. 1, issued September 2, 2016. The questions are stated verbatim and followed by the response.

Respectfully submitted,

UNITED STATES POSTAL SERVICE

By its attorney:

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September 13, 2016

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1. Please refer to the Bradley Report, pages 4-5, where it discusses the use of the Transportation Information Management Evaluation System (TIMES) and Surface Visibility (SV) data system to estimate a capacity-to-volume variability.
  - a. The report states: “[w]e produced case studies of purchased highway transportation among a variety of facilities, to understand the relationship between volume, scheduled trips, frequency, and capacity.” Bradley Report at 4.
    - i. Please provide the methodology used to develop and perform the case studies (including the methodology for selecting facilities/facility pairs).
    - ii. Please indicate the number of case studies conducted and the underlying reasons for choosing any specific number of case studies.
    - iii. Please summarize the results of the case studies, including the significant lessons learned, and the differences between case study results.
  - b. The report states: “[w]e produced a sample analysis dataset. We used that data set to estimate some preliminary econometric regressions relating capacity to volume and to investigate the quality of data.” Bradley Report at 5.
    - i. Please provide the sample dataset and the regression output.
    - ii. Please describe the issues with data quality (if any) that were observed.
  - c. The report states: “the process of building the data set required a high amount of ‘data cleaning’.” Bradley Report at 5. Please describe the “data cleaning” (e.g., steps, techniques) that were performed.

**RESPONSE:**

a.i. One of the challenges that arose in attempting to use the Times/Surface Visibility (SV) data to estimate a capacity-to-volume variability was that trip and leg designations were not consistently applied. Thus, these designations could not be solely relied upon when attempting to construct routes or trips for

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econometric analysis. Because of this challenge, the case studies were pursued to gain an understanding of how, over the course of a year, trips and legs were actually used on different types of purchased highway transportation routes. For each route analyzed, the actual trips taken over the year were individually examined to identify characteristics like the number of different legs, the various “from” facilities, the various “to” facilities, and the annual frequencies of each trip. The case studies were selected so the analysis would cover both relatively simple and relatively complex highway contract routes.

a.ii. Four case studies were selected. That number was selected because it produced analysis of a variety of route complexities without consuming an excessive amount of resources.

a.iii. The case studies revealed the existence of substantial challenges in constructing consistent and complete trips and legs for even relatively simple routes, and suggested that complicated algorithms would be required to construct a route trip dataset.

b.i. This analysis of the potential usefulness of the Times/SV data was done in the 2010 – 2011 period. It was determined that the data did not meet Commission standards, so the approach was abandoned at that time. Because the approach was abandoned, no report was prepared and the econometric exercise was not formally documented. However, regression output from that era and the two data sets used to estimate regressions were located and are included in USPS-RM2016-12/2.

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b.ii. The following list provides examples of data quality issues that were faced: difficulty in matching reported routings with building locations, concerns about the accuracy of the reported utilizations, missing observations for key variables like "leave date," and some apparent irregularities in the operations of some routes. The data problems are highlighted by the fact that less than 50 percent of tested legs had a recorded utilization for the "from" facility that matched the recorded utilization for the immediately subsequent "to" facility.

c. Data cleaning involved removing observations that had defects that disqualified them from use. For example, observations were removed for the following reasons: they had missing distances, they had a missing leave date, they were for services types other than contract highway, they had incorrect facility designations, they had insufficient annual frequencies, or they were for extra trips.

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2. Please refer to the Bradley Report, page 12, Table 2, Quarterly Average Number of TRACS Tests For Intra-SCF by DOW in FY 2010.
  - a. Please confirm that the day of week variable (*DOW*) is a discrete variable with values from 1 to 7, and that the value 1 is set for Monday. If not confirmed, please explain how the values for *DOW* variables are set.
  - b. Please explain why any binary control variables are not used to distinguish between the days of the week (e.g., weekends versus weekdays).

**RESPONSE:**

- a. Not confirmed. *DOW* is a discrete variable with the value 1 set for Sunday.
- b. The econometric estimation already uses two sets of binary control variables, one for contract size and one for a possible break in network size. Use of a discrete variable instead of another set of binary control variables for days of the week reduced the likelihood of creating a singular or near-singular matrix. This could happen, for example, if smaller contracts occur on a certain day, like Sunday.

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3. The Bradley Report, pages 23-33, describes tests to determine the robustness of the regression models, which also have been incorporated into the SAS files included with USPS-RM2016-12/1.
- a. If additional tests (other than those noted above) have been performed, please describe the tests and results. Please also provide the SAS output files.
  - b. Please indicate whether or not the Postal Service performed any test(s) similar to the one it performed in Docket No. RM2014-6 (Proposal Six) when it applied a combination of a leverage test and a measure of Cook's D to remove influential outliers. See Docket No. RM2014-6, (Proposal Six), Library Reference USPS-RM2014-6/1, "Report on Updating the Cost-to-Capacity Variabilities for Purchased Highway Transportation" at 23. If such tests have been performed, please describe the test(s) and provide the results.
  - c. If additional tests (other than those noted above) have not been performed, please explain why such tests have not been performed.

**RESPONSE:**

- a. Not applicable.
- b. It did not.
- c. There are three reasons. First, the data used in Docket No. RM2014-6 (Proposal 6) were a cross-section, in which each observation was an individual contract. Given the diversity of contracts in the purchased highway transportation network, it was a valid concern that some of those individual contracts may have sufficiently different characteristics to cause them to be influential outliers. In contrast, the present data set is a time series in which each observation is the sum of dozens of different TRACS tests, which greatly reduces the potential impact of an individual contract. Second, previous work with

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individual highway contract data suggested that contracts with unusual specifications were likely to occur. Previous work with TRACS tests suggested unusual observations were not likely to occur. Third, an unusual observation in the current data set would be an unusual day, rather than an unusual individual contract. Review of the data suggested that Sundays were potentially unusual for some transportation types, because of very low highway activity. That issue was dealt with directly through use of a binary control variable instead of eliminating observations.

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4. The Bradley Report, page 33, states: "[t]he capacity-to-volume variabilities that will be applied...are from the translog model using day-of-week data from FY2011 through FY2015, corrected for autocorrelation."
- a. Please explain why the dataset that excludes the FY 2010 data better reflects the current purchased highway transportation network than the dataset for the period from FY 2010 through FY 2015.
  - b. Please explain why the more aggregated day-of-week specification was chosen over the weekly specification.

**RESPONSE:**

a. There was a large reduction in truck trips on the purchased highway transportation network starting in FY 2011, reflecting a possible restructuring of the purchased highway transportation network. In addition, the Postal Service's network realignment efforts hold potential impact for the capacity needed on the purchased highway network, and those efforts have proceeded in years subsequent to FY2010.

However, as the following table shows, dropping the FY2010 data had modest effects on the estimated variabilities. In most cases, it caused an increase in the variability of a few percentage points, as shown in the following table.



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Estimated Variabilities from the Double Log and Translog Models

**Double Log Model**

Change From  
Dropping FY 2010  
Data

Transportation Type	
Intra-SCF	0.0050
Inter-SCF	0.0080
Intra-NDC	-0.0107
Inter-NDC	0.0128

**Translog Model**

Change From  
Dropping FY 2010  
Data

Transportation Type	
Intra-SCF	0.0215
Inter-SCF	0.0418
Intra-NDC	-0.0033
Inter-NDC	0.0208

Source: Table 13 on page 30 from "Research on Estimating a Variability of Purchased Highway Transportation Capacity with Respect to Volume."

b. The weekly specification also provides evidence that the capacity-to-volume variabilities are less than one hundred percent, suggesting the day-of-week results are robust to a different time aggregation. Both approaches produce solid models and reasonable variabilities. However, in estimating volume variable purchased highway transportation costs, one specification must be chosen to provide the necessary variabilities.

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The advantage of the day-of-week specification relative to the weekly specification is that it employs a higher number of TRACS tests in forming each observation used in the econometric estimation. But it has the disadvantage of providing fewer observations for equation estimation. On balance, a review of the results suggested the former advantage outweighed the latter disadvantage, and the day-of-week specification was chosen. The following table shows that the impact of that choice was the application of higher capacity-to-volume variabilities.

Estimated Variabilities from the Translog Model

Account Type	Day of Week	Weekly	Difference
Intra-SCF	77.27%	71.25%	-6.02%
Inter-SCF	82.12%	74.95%	-7.17%
Intra-NDC	78.77%	72.63%	-6.14%
Inter-NDC	84.82%	81.60%	-3.22%

Sources: Table 13 on page 30 and Table 14 from page 32 from "Research on Estimating a Variability of Purchased Highway Transportation Capacity with Respect to Volume."

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5. The Bradley Report, page 34, states: “[t]able 15 presents the current cost-to-capacity variabilities along with their associated capacity-to-volume variabilities”.
- a. Please clarify which fiscal year data were used to develop the cost-to-capacity and capacity-to-volume variabilities presented in Table 15.
  - b. Please explain why the Postal Service chose to use a different dataset to develop cost-to-capacity variabilities than it used to develop capacity-to-volume variabilities in Docket No. RM2014-6.
  - c. Does the Postal Service believe that there are possible interactions between the cost-to-capacity and the capacity-to-volume models and/or their results? If so, please describe these interaction(s), the consequences and how they were addressed. If not, please explain why not.

**RESPONSE:**

- a. The cost-to-capacity variabilities in Table 15 are the ones approved by the Commission in Docket No. RM2014-6. They are based upon data from FY 2013. The capacity-to-volume variabilities are taken from Table 13 in the report. They are from the translog model and are based upon data from FY2011 through FY 2015.
- b. The cost-to-capacity variabilities relate the cost of purchased highway transportation to its capacity. It thus requires data on highway cost and highway capacity. The capacity-to-volume variabilities, in contrast, relate highway capacity to transported volume, and thus require data on capacity and volume. There is not a single Postal Service data set that includes data on cost, capacity, and volume, so two different data sets were required, one that included the

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necessary data for estimating the cost-to-capacity variability and another one that included the necessary data for estimating a capacity-to-volume variability.

c. It is unlikely that there are material interactions between the two sets of models because each represents a separate, and different, step in the running of the purchased highway transportation network. In the first step, the combination of volume, service standards, and geography determines the needed capacity in the network. The capacity-to-volume variabilities reflect this step. In the second step, the needed capacity is put out to bid to private contractors and the resulting auction process determines the cost. The cost-to-capacity variabilities reflect this step.

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6. The Petition, page 3, states: “[b]oth double-leg and translog models were estimated for Intra-SCF, Inter-SCF, intra-NDC, and Inter-NDC transportation categories.”
- a. If any additional models that had functional forms other than double log or translog were tested, please explain why these models were rejected. Please also identify the functional forms of the tested and rejected models, and provide the applicable documentation (including the dataset used for regression analysis, SAS programs and output report) related to the utilization of these models.
  - b. If models of other functional forms were not tested, please explain why only double log and translog functional forms were considered.

**RESPONSE:**

- a. No other functional forms were estimated.
- b. The double log model was used because that was the functional form first specified by the Postal Regulatory Commission analysis of capacity-to-volume variabilities in Docket No. N2010-1. The translog model was added because it is a more flexible functional form and is effectively used when there is no information about the shape of underlying transformation surface. The translog specification has also been successfully used in previous transportation analyses. The two models were applied to a wide variety of different specifications, including a “trips” specification, a moving capacity specification, a specification that removed zero volume tests, a specification that corrected for autocorrelation, a specification that dropped FY 2010 data, and a specification that was based upon weekly aggregation of the data. Across this spectrum of alternatives, the double log and translog models performed well, so there was

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little, if any need, for investigating alternative specifications. In addition, there is no technical or operational information that would support the use of more restrictive functional form specifications.

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7. Please discuss whether or not, on the preliminary stage of the regression analysis, the Postal Service considered any additional control variables to be included in the regression models (e.g., to control for changes occurred in the particular quarters or years). If additional control variables were considered, please provide a list of such variables and explain why they were not included in the final regression models provided in the Library Reference USPS-RM2016-12/1.

**RESPONSE:**

At one point in the research, a binary control variable for FY 2011 (just like the binary control variable for FY 2010 in Library Reference USPS-RM2016-12/1) was included in the models. Because the coefficient on the FY 2011 binary control variable was never statistically significant, it was dropped from the analysis.

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8. Please confirm that changes in capacity during a trip (*i.e.*, when a vehicle unloads/loads mail at a stop and then continues) have been incorporated into the provided variability analysis.
- a. If confirmed, please explain how this was accomplished.
  - b. If not confirmed, please describe any:
    - i. obstacles that prevented incorporating such changes in capacity into the analysis; and
    - ii. reasons why accounting for such changes does not seem to be relevant.

**RESPONSE:**

- a. Not applicable.
- b. i. and ii. Capacity is defined by the cubic capacity of the truck on which the mail is carried. This does not change when mail is loaded or unloaded at a stop and then continues. Because capacity does not change at individual stops, it does not seem relevant to attempt to account for any such changes.



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9. Please refer to USPS-RM2016-12/1, folder "Input.Data.Sets." Please provide the names and the definitions for the complete set of variables used in the input SAS data files. Specifically, for the tables included in "Input.Data.Sets" folder, please provide the full name and description of each abbreviated column heading.

**RESPONSE:**

Please see the following listing:

<b>Variable Name</b>	<b>Full Name</b>	<b>Description</b>
TESTID	Test Id	Identification number for the TRACS test on which the data were collected
UNLOADED	Proportion Unloaded Mail	The proportion of the truck capacity that is unloaded mail.
REMAIN	Proportion Remaining Mail	The proportion of the truck capacity for mail that remains on the truck.
EMPTY	Proportion Empty	The proportion of the truck capacity that does not have mail.
EMPTYEQU	Proportion Empty Equipment	The part of empty space that is dedicated to empty equipment
CAPACITY	Capacity	The capacity of the truck
CON_TYPE	Contract Type	The type of contract covering the purchased highway transportation
FACCAT	Facility Category	The type of facility at which the truck stops.
FRMCOUNT	Frame Count	The frame count of stop days by contract and facility category
MNTH	Month	Month in which the TRACS test was taken
YR	Year	Year in which the TRACS test was taken

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<b>Variable Name</b>	<b>Full Name</b>	<b>Description</b>
FY	Fiscal Year	Fiscal Year in which the TRACS test was taken
TESTDATE	Test Data	The date on which the TRACS test was taken
PQ	Postal Quarter	The Postal Quarter in which the TRACS test was taken
DOW	Day of Week	The day of the week on which the TRACS test was taken
COUNT	Count	A count variable which is always equal to one.
SAMPSIZE	Sample Days	Sampled stop days by contract type and facility category
STRATUM_WEIGHT	Stratum Weight	The TRACS stratum weight associated with the test which equals the number of annual trips on the contract.
PER_EMPTY_SPACE	Percent Empty Space Including Empty Equipment	The empty space (including empty equipment) proportion expressed as decimal
PER_EMPTY_TABLEVI	Percent Empty Space Excluding Empty Equipment	The empty space (excluding empty equipment) proportion expressed as decimal
PER_MAIL_VOLUME	Percent Mail Volume	The mail volume proportion expressed as a decimal
EMPTY_SPACE_CUBE	Empty Space Cube	Annual empty space found as empty space cube times the number of trips per year
MAIL_VOLUME_CUBE	Mail Volume Cube	Annual mail volume space found as mail volume cube times the number of trips per year.

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<b>Variable Name</b>	<b>Full Name</b>	<b>Description</b>
TOTAL_VOLUME_CUBE	Total Volume Cube	Total annual available space found as truck capacity times number of trips per year.
TRIPS	Trips	The number of annual trips on the contract
EMPTY_SPACE_TABLEVI	Table VI Empty Space	The empty space found as the empty space (excluding empty equipment) proportion times the number of trips per year.